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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/700,084	11/09/2000	Akira Nishimura	360842006800	1476

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EXAMINER	
WACHTEL, ALEXIS A	

ART UNIT	PAPER NUMBER
1771	6

DATE MAILED: 11/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/700,084	NISHIMURA ET AL.
	Examiner	Art Unit
	Alexis Wachtel	1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *09 November 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Detailed Action

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 21 and 22 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 21, Applicant fails to describe what is meant by phrase "alternately laminated". What does Applicant mean? Examiner assumes alternately laminated means for two or more plies to be affixed to each other in any manner known in the art.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by JP 08134757.

JP 08134757 is directed to a fiber reinforced resin formed article and teaches a reinforcing material composite cloth made by integrating laminated woven fabrics and nonwoven fabrics.The nonwoven is made of short nylon fibers. The woven fabric is made of 1500 denier nylon filaments. The woven fabric is sandwiched between two nonwovens made of short nylon fibers. The woven fabric and nonwoven fabrics are

consolidated by needling (Abstract).

5. Claim 2 is rejected under 35 U.S.C. 102(b) as being anticipated by US 4282283 to George et al.

George et al is directed to laminated fiberglass fabrics and teaches a composite made by laminating a nonwoven fabric to a woven fiberglass fabric with plastisol laminating adhesive (Abstract).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 3 rejected under 35 U.S.C. 103(a) as being unpatentable over US 4906506 to Nishimura et al.

Nishimura discloses a known preform material formed by disposing webs made of short heat-melting fibers and formed as a mat between a mat of glass fibers and a woven fabric by melting the webs (Col 2, lines 34-39). The webs are assumed to be nonwoven mats by examiner. Given that the webs are disclosed as meltable and absent evidence to the contrary, at least some of the fibers of the web can be assumed to be low melting point fibers. Nishimura as set forth above fails to teach the percent by weight amount of low melting point fibers. However since, the amount of low melting point fibers affects the rapidity with which the preform material may be consolidated, it would have been obvious for one of ordinary skill in the art to have optimized the

bonding characteristics of the webs by selecting the appropriate percent by weight of low melting point fibers through the process of routine experimentation.

8. Claim 3 rejected under 35 U.S.C. 103(a) as being unpatentable over JP 3-234522.

JP 3-234522 is directed to a fibrous matter reinforcing sheet for reinforced plastic and teaches a composite made of long fibers arranged in parallel with one another to form a sheet, and are connected to each other by making use of a heat fusing sheet provided in the form of a nonwoven. Examiner assumes that the nonwoven is meltable. Examiner notes that the long fibers constitute a reinforcing material. JP 3-234522 as set forth above fails to teach the percent by weight amount of low melting point fibers in the fuseable nonwoven. However since, the amount of low melting point fibers affects the structural consolidation of the long fibers, it would have been obvious for one of ordinary skill in the art to have optimized the bonding characteristics of the webs by selecting the appropriate percent by weight of low melting point fibers through the process of routine experimentation.

9. Claims 3,8,9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4906506 to Nishimura et al in view of US 5082720 to Hayes.

Nishimura et al teaches a preformed material for fiber reinforced plastics that includes a material wherein a first sheet-like substrate that is woven has been provided with a bonding material, wherein a second substrate is a mat made of short fibers (Col 3, lines 38-45). Examiner takes mat to mean a nonwoven. Reinforcing fibers that may be used in the substrates includes carbon fibers (Col 3, lines 47-50). The bonding

material is a thermoplastic polymer that can be made of a relatively low melting point polymer such as nylon or copolymerized nylon. Such copolymerized nylon can be selected from the group consisting of copolymerized nylon 6, and nylon 66. The bonding material is employed ONLY for the purpose of integrally bonding the substrates, and NOT as a matrix for FRP. Therefore the amount of bonding material is preferably as little as possible (Col 4, lines 6-19).

Nishimura et al as set forth above fails to teach the use of a nonwoven fabric for bonding said first and second substrates, wherein the nonwoven as claimed is to be made of 5 to 50% of low melting point fibers, wherein the fibers are sheath core conjugate fibers having a core comprised of nylon 6 or nylon 66 and a sheath of nylon copolymer. Hayes is directed to bicomponent fibers and webs made therefrom and teaches that it is well known to use melt-bondable bicomponent fibers to form bonded nonwoven articles without the need for the coating and curing of additional adhesives, thereby resulting in economical processes (Col. 1, lines 10-18). Examiner notes that said melt-bondable bicomponent fibers perform the EXACT SAME function that the bonding material in Nishimura et al's article does. The bicomponent fibers can be disposed in a sheath core arrangement (Col 3, lines 27-32). The higher melting component can be spun as a core with the lower melting point component spun as a sheath surrounding the core (Col 5, lines 32-35). The core can be made of nylon (Col 3, lines 55-60). Examiner notes that nylon 6 and nylon 66 are very well known materials for making copolyamide bicomponent fibers from. The sheath is made of a blend of polymers which must be compatible. "Compatible" refers to a blend wherein the

components thereof exist in a single phase. The blend of polymers comprising the sheath preferably comprises crystalline and amorphous polymers of the same general polymeric type such as polyester (Col 4, lines 7-15). Polyamide is useful as a sheath material (Col 4, lines 60-63). Examiner notes that the polyamide is a blend of amorphous and crystalline polyamide and thus constitutes a polyamide copolymer. Examiner notes that nylon is a very well known and useful polyamide. As such the copolyamide can be a nylon copolymer made of amorphous and crystalline nylon blends. The core to sheath weight ratios can vary from 25:75 to 75:25 (Col 5, lines 13-16). Since the bonding material described by Nishimura et al and the nonwoven made of bicomponent fibers as set forth above, it would have been obvious for one of ordinary skill in the art at the time the invention was made to have replaced the bonding material with the nonwoven made of bicomponent fibers. One of ordinary skill would have been motivated by the desire to save production costs by using a bonding nonwoven instead of an adhesive. Regarding claim 9, since the ratio of the cross sectional diameter of both core and sheath determines the bonding charecterstics and strength of the multicomponent fibers, it would have been obvious for one of ordinary skill in the art to have optimized the sheath and core cross sectional ratios through the process of routine experimentation.

10. Claims 1,2, 4-7, 12-19, 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4906506 to Nishimura et al in view of JP 08134757.

Nishimura et al teaches a preformed material for fiber reinforced plastics that includes a material wherein a first sheet-like substrate that is woven has been provided

with a bonding material, wherein a second substrate is a mat made of short fibers and is attaches to said first substrate (Col 3, lines 38-45). Examiner takes mat to mean a nonwoven. Reinforcing fibers that may be used in the substrates includes carbon fibers (Col 3, lines 47-50). The bonding material is a thermoplastic polymer that can be made of a relatively low melting point polymer such as nylon or copolymerized nylon.Such copolymerized nylon can be selected from the group consisting of copolymerized nylon 6, and nylon 66. The bonding material is employed ONLY for the purpose of integrally bonding the substrates, and NOT as a matrix for FRP. Therefore the amount of bonding material is preferably as little as possible (Col 4, lines 6-19). The preferable weight of woven fabric substrate is 60-700g/m^2 (Col 4, lines 30-32).The woven fabric can be a unidirectional weave per Fig. 52 that is composed of reinforcing fibers and auxiliary filamentary yarns 601 as warps (Col 11, lines 25-18). Examiner notes that reversing the warp and weft assignments is within the level of ordinary skill, thus satisfying claims 12 and 13. The woven fabric can be a non-crimp woven as illustrated in Fig.78 wherein yarn groups 701a and 701b are reinforcing fibers woven together and held together by auxiliary yarn 602a stitched into the woven (Col 12, lines 58-68, Col 13, lines 1-2). Examiner notes that reinforcing fibers are substantially flat as seen from Fig. 78. In addition, reinforcing fibers have a cross sectional area of 0.03 -0.60 mm2 (Col 22, lines 15-16).

With regards to claim 1, Nishimura fails to teach that the nonwoven can be needled to the first sheet-like substrate. JP 08134757 teaches that is known for fiber reinforced articles to have a nonwoven needled to a woven (Abstract). In view of this

teaching, it would have been obvious for one of ordinary skill in the art at the time the invention was made to have needled the nonwoven substrate to the first sheet-like substrate motivated by the desire to further reinforce the resulting structure.

With regards to claims 4,5, Nishimura et al fails to teach the claimed fiber size and number of filaments per reinforcing fiber. Since it is well known that carbon fibers are made of a plurality of carbon fiber filaments that are held together with a resin, it would have been obvious for one of ordinary skill in the art to have optimized the strength of the reinforcing fiber by selecting the optimal number of filaments present through the process of routine experimentation. In addition, since the reinforcing fiber size is proportionally related to the amount of filaments presents in the reinforcing fiber, it also would have been obvious for one of ordinary skill to have optimized the strength of the reinforcing fiber by selecting the appropriate fiber size through the process of routine experimentation.

With regards to claim 7, although Nishimura et al and JP 08134757 fails to teach the claimed cover factor, it is reasonable to presume that said limitations would be met by the combination of the two references. Support for said presumption is found in the use of similar materials (i.e. reinforcing material and nonwoven) and in the similar production steps (i.e. consolidation by needling) used to produce the preformed material. The burden is upon the Applicant to prove otherwise.

With regards to claim 14, Nishimura et al fails to teach that the reinforcing fibers of the unidirectional weave are oriented in the length direction at spacing intervals of 0.1 to 5mm. However, since the spacing intervals affect the flexibility of the unidirectional

weave it would have been obvious for one of ordinary skill in the art at the time the invention was made to have optimized the spacing interval through the process of routine experimentation.

With regards to claim 16, Nishimura et al fails to teach that the reinforcing fibers of the non-crimp woven have a width in the range of 4 to 30mm and a thickness in the range of 0.1 to 1.0mm. Since the reinforcing fibers have been disclosed as having a cross-sectional area of 0.03 to 0.60mm^2, are flat and ribbon-like as seen in Fig.78, and function to reinforce, it would have been obvious for one of ordinary skill of the art to have optimized the strength of the reinforcing fibers by selecting the appropriate thickness and width of said reinfocring fibers throuhg the process of routine experimentation.

With regards to claim 19, although Nishimura et al and JP 08134757 fails to teach the claimed void ratio, it can be assumed inherent given that the same starting materials are used: (reinforcing material and nonwoven) and the same process is used (reinforcing material needled to nonwoven). In the alternative, the claimed cover factor would have obviously been provided. Burden of proof has been shifted to Applicant.

Regarding claims 24 and 25, Examiner takes Official Notice that the method of vaccum bagging is very well known in the composite art. It would have been obvious for the methods of claims 24 and 25 to be used in conjunction with the article taught by Nishimura et al and JP 08134757 to make the desired composite shape. One of ordinary skill in the art would have been motivated by the desire to make use of a well known and environmentally friendly method of making resin impregnated composites.

Examiner notes that vaccum bag molding systems use a mold to which the vaccum bag conforms thus forming a male/female molding system that uses vaccum to impregnate a composite with resin.

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 08134757.

JP 08134757 as set forth above fails to teach the claimed weight range of the nonwoven fabric per claim 11. Since the per unit area weight of the nonwoven contributes to the durability of the composite cloth, selecting the appropriate unit area weight would have been determined through the process of routine experimentation.

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 4282283 to George et al.

George et al as set forth above fails to teach the claimed amount of adhesive used per m^2 of the composite. However, since the amount of adhesive determines the bonding strength of the resulting composite, it would have been obvious for one of ordinary skill to have optimized the amount of adhesive used through the process of routine experimentation.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Alex Wachtel, whose number is (703)-306-0320. The Examiner can normally be reached Mondays-Fridays from 10:30am to 6:30pm.

If attempts to reach the Examiner by telephone are unsuccessful and the matter is urgent, the Examiner's supervisor, Mr. Terrel Morris, can be reached at (703) 308-2414. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

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